

## EXHIBIT 8

# HP 9000 rp8420 Server User Service Guide

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**Table 5-9 Disk Drive LEDs**

Activity LED	Status LED	Flash Rate	Description
Off	Green	Steady	Normal operation, power applied
Green	Off	Steady	Green stays on during foreground drive self-test
Green	Off	Flutter at rate of activity	I/O Disk activity
Off	Yellow	Flashing at 1Hz or 2 Hz	Predictive failure, needs immediate investigation
Off	Yellow	Flashing at 0.5Hz or 1Hz	Operator inducing manually
Off	Yellow	Steady	Module fault, critical
Off	Off	LEDs off	Unit not powered or installed

## Server Management Subsystem Hardware Overview

Server management for the HP 9000 rp8420 server series is provided by an MP on the core I/O board. The server management hardware is powered by standby power that is available whenever the server is plugged into primary AC power. This allows service access even if the DC power to the server is switched off.

The MP communicates with the server subsystems, sensors, and PDC by internal buses. It also communicates with the operating console and session gettys by universal asynchronous receiver-transmitters (UARTs) on the core I/O PCI bus.

Connection to the management processor is by way of three I/O paths:

- An RS-232 port for a local terminal
- An RS-232 port for a modem connection
- A 10/100/1000 baseT LAN port (Web console)

When the server is configured with one core I/O board, that board must be in slot 0, since the master MP is always the MP on the core I/O board in slot 0.

When the server is configured for two partitions, it must contain two core I/O boards, one for each partition. It will also contain two MPs. In this case, the MP in slot 0 is the master MP and provides all of the server management functions. The MP on the core I/O board in slot 1 is a slave MP and redirects the operating system gettys to the master MP over an internal MP-to-MP link. All external connections to the MP must be to the master MP in slot 0. The slave MP ports will be disabled.

For high availability (HA), the server powers up and powers down without an MP. Booting HP-UX without an MP depends on the ability of the operating system to boot without a console getty. Thus, in a two-partition system, the partition with a failed MP might not boot, since the MP provides the console getty.

The server configuration cannot be changed without the MP.

Resetting the MP through a modem connection may cause Admin^M to display on every **enter** keystroke. Attempting a modem reset (MP command MR) does not clear this incorrect response. This is not experienced with a telnet connection.

A new Login prompt regains control by following these steps:

1. Enter Admin (case sensitive) and press <**enter**><**ctrl + enter**> keys.
2. A new Login prompt is created.
3. Re-enter Admin <**ctrl + enter**> to move on to the Password prompt.
4. Enter Admin <**ctrl + enter**> to reach the Main Menu.

Afterwards, the **^M** will not return when the **enter** key is pressed. The issue will return if the MP is reset through the modem.

## Server Management Overview

Server management consists of four basic functional groups:

- Chassis management
- Chassis logging
- Console and session redirection
- Service access

### Chassis Management

Chassis management consists of control and sensing the state of the server subsystems:

- Control and sensing of bulk power
- Control and sensing of DC-to-DC converters
- Control and sensing of fans
- Control of the front panel LEDs
- Sensing temperature
- Sensing of the power switch
- Sensing chassis intrusion
- Reading FRU PROMS

### Chassis Logging

Chassis logging consists of maintaining logs of chassis codes:

- Boot codes
- Activity codes
- Error codes

### Console and Session Redirection

Console and session redirection allows the console and session terminals to be connected over RS-232, a modem, or a LAN connection (Web console).

### Service Access

Service access allows access to and control of server state. Service access is secured by a password. Service access functions include:

- Access to chassis logs
- Configuration of partitions
- Control for online addition and replacement
- Access to the virtual front panel
- Transfer of control and reset

## Server Management Behavior

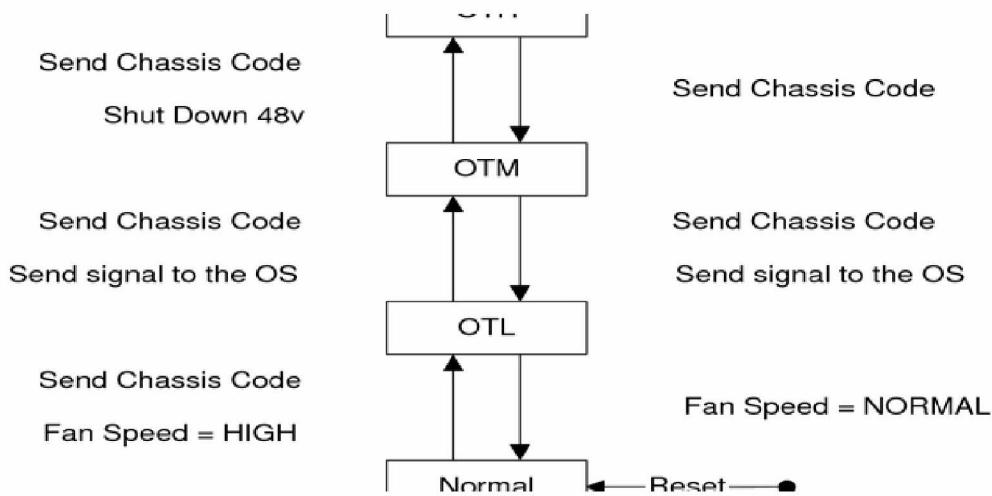
This section describes how the system responds to over-temperature situations, how the firmware controls and monitors fans, and how it controls power to the server.

### Thermal Monitoring

The manageability firmware is responsible for monitoring the ambient temperature in the server and taking appropriate action if this temperature becomes too high. To this end, the ambient

temperature of the server is broken into four ranges: normal, overtemp low (OTL), overtemp medium (OTM), and overtemp high (OTH). Figure 5-10 shows the actions taken at each range transition. Actions for increasing temperatures are shown on the left; actions for decreasing temps are shown on the right.

**Figure 5-10 Temperature States**



On large temperature swings, the server will transition through all states in order. It might go to the following state immediately, but each of the preceding actions will occur. If the temperature reaches the highest range, the server will be shut down immediately by the manageability firmware.

## Fan Control

There are three sets of fans in the system: those on the I/O bay, the front and rear fans that are connected to the main backplane, and those on the cell boards. The front fans are run off of standby power, and will be running any time AC input power is supplied to the server. All of the fans turn on when 48 V power is supplied to the system.

As shown Figure 5-10, the fan behavior is related to the temperature state. The fans will be set to high speed when the ambient temperature is anywhere above the normal operating range. The front and rear fans will be set to high speed any time a chassis intrusion switch is triggered when removing a side cover.

## Altimeter Circuit

The PCI-X backplane contains an altimeter circuit. This circuit is used to adjust the chassis fan speeds for the operating altitude at power on and during MP initialization. The chassis fans consist of the nine front fans, twelve rear fans, and the six PCI-X I/O assembly fans. If an altimeter failure is detected, the information is logged as an Event ID then propagated to the OS level to be picked up by monitoring diagnostics.

The altimeter circuit is checked at power on by the MP. If an expected value is returned from the altimeter circuit, the altimeter is determined good. The altimeter reading is then set in non-volatile random access memory (NVRAM) on board the core I/O card. If the value is ever lost like for a core I/O replacement, the NVRAM will be updated at next boot provided the altimeter is functioning normally. If the altimeter has failed, and the stable storage value has been lost because of a core I/O failure or replacement, the MP will adjust the fan speeds for sea-level operation.